

University of Groningen

Characterization and device physics of polymer semiconducting devices with metal oxide contacts

de Bruyn, Paul

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:
2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

de Bruyn, P. (2018). *Characterization and device physics of polymer semiconducting devices with metal oxide contacts*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Stellingen

behorende bij het proefschrift

Characterization and device physics of polymer semiconducting devices with metal oxide contacts

door Paul de Bruyn

1. The performance of inverted solar cells with an ITO/ZnO cathode, fabricated through the low temperature decomposition of $\text{Zn}(\text{acac})_2$, is equivalent to cells made in the conventional bottom anode, top cathode geometry (chapter 2).
2. A short, low temperature annealing step of $\text{Zn}(\text{acac})_2$ under ambient conditions is sufficient to produce electrically well-performing ZnO electron transport layers in organic semiconductor devices (chapter 3).
3. All-solution processed polymer light-emitting diodes with two ohmic contacts can be fabricated with enhanced air stability by employing metal oxide transport layers (chapter 4).
4. Dispersions of PEDOT:PSS can be modified by addition of Dimethylaminoethanol to increase the pH value and these dispersions can then be used in the charge recombination layer together with ZnO to create organic tandem solar cells (chapter 5).
5. The diffusion current in organic metal-insulator-metal diodes with one ohmic and one non-ohmic contact can be analytically modeled by adapting the classical diffusion current derivations to the appropriate boundary conditions (chapter 6).
6. By deriving equations for the influence of the Gaussian density of states of organic semiconductors on barrier lowering, the injection-limited current from a non-ohmic contact in organic metal-insulator-metal diodes can be analytically derived (chapter 7).
7. Van uitstel komt uiteindelijk ook wel eens inzicht.